TRAINING IN THE U.S. NAVAL SERVICE

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TRAINING IN THE U. S. NAVAL SERVICE

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PREFACE

The establishment and administration of an effective training program is a vital and integral part of the Naval Service. Any statement merely to the effect that training is important would indicate a lack of real comprehension of the problem. Training in itself is the greatest single factor that makes possible the accomplishment of the primary mission of the Navy: that of safeguarding the national security.

In an increasingly complex social structure composed of new and more efficient machines, methods, and concepts, modern war has kept apace with developments in other fields. No longer is the will to win sufficient to guarantee victory; victory will belong to that organization which has the equipment and trained ability, as well as the morale, and can blend a combination of all three to produce the desired results.

The one valid reason for the existence of an armed force lies in its potentiality to win battles; every job of training in the Navy has as its ultimate aim combat at sea or in the air. This concept is so fundamental as to be sometimes overlooked, but Naval personnel must have this basic understanding. It then follows that one of the

primary justifications for the maintenance of the Navy in peacetime is the perpetuation of training activities.

A great deal has been written concerning training activities in the Navy; much of this material is technical in approach and in content. It will be the purpose of this study to examine and attempt to evaluate some of the underlying values and concepts, as well as to acknowledge the debt of the Service to certain outside factors and institutions. It is the belief of the writer that this approach may prove valuable in that the whole field of Navy training is now in the process of revision and intensification chiefly as a result of experiences in the recent war. It was then conclusively demonstrated that a training program, no matter how large in scope, cannot be basically sound unless founded on the psychological principles of learning and taught with regard to the practical application of modern educational theory.

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CHAPTER I

THE PROBLEM

Introduction

Traditionally, training in the Navy was carried on in a manner that closely approached the Old World apprentice system. The recruit was regarded as a new and therefore inexperienced member of the establishment, and his training was a problem not only for his immediate superiors but also for his colleagues. His training at first followed the steps that undertook to qualify him as a seaman, whereafter he decided what particular line of work in which he wanted to specialize. For specialized training in a certain rating he was assigned either to an individual or to a group currently engaged in the sort of work that the newly made seaman wanted to learn. He was then known as a "striker" for that rate; the Navy custom of "striking for a rate" was in reality the very first accepted and approved system of training in the Service, and has lasted to the present time. The striker is really no more than an apprentice.

This apprentice training was supplemented about 1930 by the establishment of service schools of various sorts whose mission was to give training in certain areas or lines

of work; very often the elementary service school did little more than familiarize the recruit with the jargon and tools with which he would be expected to work after he left the school and went to sea. There were, of course, more advanced schools designed to qualify men already rated for further advancement in their rate. There were also schools for highly specialized areas such as the submarine service.

With the tensions that existed before this country's entry into the recent war, the Navy about 1940 expanded the service school facilities, but with the actual advent of the war it soon became apparent that the system was woefully inadequate for the vast numbers of men that emerged from the recruit training stations ready to be indoctrinated in one of the many ratings. For example, the Naval Training Center at Farragut, Idaho, during the war period trained a number of men almost equal to that of the whole Navy at the time of Pearl Harbor.

The Need for Training

Prior to the outbreak of the war, the Training Division of the Bureau of Naval Personnel became aware of the fact that the training program in the Navy had neither the scope nor the equipment to meet the demands of the National Emergency as declared by the President of the United States in September, 1939. Naval appropriations, never oppulent in peace years, did not allow of expansion in the degree considered necessary.

Stop-gap aid was sought and obtained under the provisions of the Smith-Hughes Act of 1917, as amended by the George-Ellsey Act of 1934 and the George-Dean Act of 1936. This legislation was designed to provide federal aid for the purpose of furthering vocational training in public education. With the cooperation of the United States Office of Education, the various state departments of education, and the local school systems, the Navy was able to expand its facilities and operations in the training field. Several very able officers directed this expansion that augmented Naval training, and under their leadership the gradual evolution began that was to culminate in the gigantic program that existed at the close of the war.

After the war had officially begun, civilian instructors who were employed in this phase of training were inducted into the Navy, and the rating of Specialist "T" was created expressly to designate these teachers. At about the same time, many civilian educators from some of the foremost civilian institutions were commissioned in the Navy and were assigned to the Training Division where they worked in planning, policy-making, and administration. It was then that the entire concept of training in the Naval Service underwent alteration and it was realized that modern training must be approached through the medium of the scientific method. Certain definite principles of training that had evolved over long periods of time in the civilian situation were

applied to the military problem at hand, and in due time it was proved that the educational and psychological approach to the field of training was indeed valid in the Naval situation.

It is the present responsibility of the Navy to conduct research continually in related fields of training in civilian life, and to adopt applicable methods and procedures to improve the operation and content of its own training program. The training program in the Navy must be kept current and be adaptable to a sudden yet orderly expansion in the event of mobilization; the war of the future will be too swift to allow for the extensive and time-consuming preparations that characterized the early training program in the last conflict. The Navy was unprepared for the position in which it found itself; it was fortunate that there were men with the ability to take over the training responsibility and evolve system out of chaos. However, having benefited from the experience and from the program that was developed, it is the responsibility of the Naval Service today to maintain a training activity based on the principles and procedures of modern educational philosophy that were shown to have greater validity than the old system of Navy training in use prior to World War II.

Present Training Facilities in the Navy

The Naval training program is constantly undergoing

change and revision with regard to needs and material. With every piece of gear that becomes obsolete, with every method that becomes out-dated, a certain amount of training becomes meaningless. Likewise, with every new device or machine that is adopted and with every new procedure that is developed, a training need is created. It is therefore obvious that a training program that remains static does not maintain its purpose; knowledge and abilities must keep pace with technical and procedural advances. It is with this objective in mind that the present training activities are conducted.

Recruit Training

The basic training of the recruit is concerned with transforming a civilian into a potential member of the Navy team. In the space of a few short weeks, usually averaging from eight to fourteen, the recruit learns primarily how to adapt to life in a line organization, a concept that is foreign to his background and experience. Guidance and indoctrination introduce him to the manners, practices, discipline, and customs of the Navy life. This training is general in character because of the wide variety of programs open to the recruit upon his finishing basic training; he is given the rudiments of professional training and is made aware of the many opportunities that lie before him.

In addition to his learning how to live in an ordered society and being acquainted with the fundamentals of his

new profession, the recruit must be made ready for service in other ways. He is made physically ready for service, for the Navy life is a hard and rigorous one and the demands made on physical strength and endurance are many. He must have physical conditioning and be taught to swim, for upon this ability his life may someday depend. He must have medical and dental attention; minor defects are corrected, and he is inoculated against a wide variety of diseases. He must also be made mentally ready for service; he is taught the reasons for military discipline and its application. He is shown how the Naval organization is dependent upon the individual's sense of responsibility, and how this in turn leads to the development of an attitude of cooperation. His mental conditioning must stress the keynotes of cooperation, teamwork, and unity. Finally, the recruit is made personally ready for active service; his personal needs and obligations are accounted for so he will be better able to concentrate on the job before him.

Toward the conclusion of the recruit's basic training, he is interviewed and classified according to abilities and aptitudes as they have been indicated both by tests and by performance in training. This procedure was developed at training stations during the war by educators and psychologists working with the Navy, and has repeatedly proved its worth; the old system of selecting men for particular schools and details was simply to choose the first certain number

of men standing in line or names that appeared on a list. The new system of classifying by means of individual interviews conducted by specialists with training and experience has proved of inestimable value. It must be remembered that the recruit training graduate is not a finished seaman, but has only just arrived at the point where his professional training begins.

The whole theory of recruit training has undergone a complete revision in the past few years; a recent statement by the Bureau of Naval Personnel defines recruit training in terms of a Four-Point Program as follows:

> The Bureau of Naval Personnel looks to recruitment and recruit training with new confidence, for the Bureau has a four-point program that is enlisting the ready cooperation of all Navy personnel.
>
> 1. The initial step sets up firm standards for the recruiting and for the training of enlisted personnel to ensure a steady flow of useful men to the operating forces.
>
> 2. Then, the need is for able management of the new men who join the fleet. This is accomplished by what may be called personnel relations--an insistence that officers and petty officers make constant application of all the tools of effective training and leadership.
>
> 3. A corollary follows. Searching examination must determine the cause of flaws or failures in the recruit training or in the fleet-operation training of the Navy's newcomers. The next step is corrective--straighten out the kinks in the training program.
>
> 4. The last step is obvious, and it is the core of the program: the whole Navy team is needed to make the program operate.[1]

Service School Training

There are four classes of service schools, graded with

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[1] "Recruit Training--A Vitalizing Concept," an article in U. S. Naval Training Bulletin, September, 1947.

respect to the difficulty of the technical material which they teach; they are classified as "P", "A", "B", and "C", with "C" being the most advanced.

The schools are charged with the mission of maintaining an establishment and curriculum sufficient to develop men in the duties and skills necessary for them to be capable of filling responsible jobs in the operating forces. It is in the service schools that thousands of men are originally trained in the technical duties they are to assume in their Navy careers. Men from the fleet are returned to the service schools for advanced training and often for training for a higher rating. One of the requirements for many Chief Petty Officer ratings is that the candidate must have successfully completed a course of study in his specialty in one of the Class "C" service schools.

In the last two or three years a system has developed whereby Type Commanders and other Flag Rank Officers with similar commands have designated, under the direction of The Bureau of Naval Personnel, an arbitrary service school quota to be filled from the various ships operating under their tactical commands. These quotas were often difficult for ships to meet, for during the demobilization every man aboard ship was vitally needed as there was none to replace him. However, the ships filled their quotas and somehow managed to remain in an operating condition, and now it is apparent that this system was a very far-sighted procedure.

These service school graduates are now being returned to the fleet at regular intervals, and are invaluable aboard ship for the training of recent recruits.

The Chief of Naval Personnel recently disseminated to the Service new criteria for the selection of candidates to be sent to the Class "A" schools. These criteria are based primarily upon the individual's scores made in the battery of tests he was given when he enlisted in the Navy. As most of these candidates are young in the Service, this system of selection would appear to have validity inasmuch as the tests were administered recently enough to give some indication of aptitude. In fact, with so little time in the Navy, the test scores are perhaps the only real basis for selection. Stress is laid upon the score made in the General Classification Test (a test of general intelligence), but for some of the more technical training various other test scores are used, such as the Electrical Knowledge Test and the Radio Code Test. The Chief of Naval Personnel emphasizes that the use of these cutting scores is most necessary.

> It is important that no men be selected who do not fulfill these requirements. Presence of such students creates an instructional problem in the Class A school, delays the progress of the rest of the class, and results in the school's returning to the Fleet a man who has gained little or nothing from the time spent away from his ship.[2]

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[2] "Criteria for Selection of Candidates for Class A Service Schools," an article in U. S. Naval Training Bulletin, June, 1947.

The problems posed by the operation of the service schools are, in reality, almost identically the same as those encountered by civilian educational institutions; basically, they are questions of philosophy, instructor training, curricula, methods, and approach. It is in these areas that the need exists for research and a determination of the best possible approach to each specific field of instruction, and it is here that the Navy can benefit greatly from the counsel and guidance of leading persons from civilian education. These problems will be discussed in more detail in a later chapter.

Shipboard Training

The officer directly responsible for the training program aboard ship is the Executive Officer, under the authority of the Commanding Officer. The Executive Officer is charged with organizing, coordinating, and controlling the training function. Such coordination is necessary because of the wide divergence of the types of training carried on in the average ship. Actually, every leader has a certain amount of responsibility, as indicated by regulations:

> In all matters pertaining to the training of the personnel and the preparation of material for battle or other activity, the quarters for muster, each division officer, petty officer, or crew leader shall be responsible for that part of the ship's personnel and material which he commands in action, in so far as this may be practicable.[3]

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[3] U. S. Navy Regulations, 1920, Article 1287, Para. (8).

In actual practice it is the custom for the Executive Officer to appoint another officer specifically as training officer; this training officer works directly with the various department heads and division officers, and reports to the Executive Officer, thus acting as an administrative assistant.

Each ship has its own particular training program, with its organization and responsibilities drawn up in what is known as a "training bill"; the training bill delineates the need, the objectives, the duties, responsibilities, and authorities, and a statement of policy. It is through this written statement that each officer and man understands his own position in the training program of the ship.

Departmental action in the shipboard training program is where the real training begins; it is the duty of each department head to determine just what training is most needed and will be the most beneficial for his personnel. This is a task that requires a thorough knowledge of the men involved, their strong points and their weaknesses, as well as a knowledge of the specific duties and skills required of each rating group within his department. It is dangerous to morale to try to teach a man something he already knows, hence the material for every training session should be scrutinized carefully and adjusted for the group to be taught. It is the objective of the department head to bring every one of his men up to the point of maximum efficiency in his present rate.

While the job of the training officer in coordinating the entire program is of the utmost importance, the keynote of the program as a whole is decentralization. Only by localizing the training can flexibility be attained as it is demanded by individual problems, equipment to be studied, or even weather conditions. Decentralization develops interest at the lower levels when the petty officers are allowed and encouraged to do a part of the planning and assume some responsibility for the training. Indeed, the very scope of the shipboard program, its wide variety and shifts in emphasis demand such decentralization.

Perhaps the greatest advantage to training aboard ship is that such training is conducted in the situation of final use; the training is pragmatic and of a project nature. All the necessary equipment and material is at hand because the set-up is real and actual. Thus the training is vitalized and has possibly more meaning than an artificially constructed mock-up or model. The disadvantage of shipboard training is that there is a lack of space in which to conduct classroom or more formal training. It may also be that the trainers are not well indoctrinated in the teaching process; a man may know his job very well, but still be unable to communicate what he knows in a teaching situation. The importance of the instructor in any training process or program cannot be stressed too greatly, and it is at this point that the training administrator aboard ship must focus his attention.

Educational Services

The educational services provided by the Navy for the benefit of enlisted personnel primarily are concerned with advancing the general education of the individual man. While his technical and job training is going on, the Navy is still interested in his educational background and the advancing of his formal schooling. Every effort is made to provide information and opportunities for the man to enroll in some program of his own choice that will further his own knowledge and his usefulness to the Service. In a recent recruit survey men were asked about their plans for additional schooling and 8.9% indicated their intention of enrolling for USAFI courses. 12.3% stated very clearly they wanted no more schooling, while 30.0% didn't know for sure what their attitude was and had no plans.[4]

Practically any field of study is available under the cognizance of the educational services; mathematics, English and history, as well as shop and on-the-job occupational training may be had under this program. Often classes are organized aboard ship or on shore stations; instructors are recruited who have had training and experience in particular fields of interest to the men who enroll. Sometimes civilian instructors are hired to teach subjects for which a demand exists. Every commanding officer has the moral obligation

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[4]Bureau of Naval Personnel, Research Activity, Field Research Section, Recruit Survey #1, Form 1, June 1947, Washington, D. C.

to do everything within his power to make available to his personnel the opportunity and material for study that may be indicated or requested.

Still another phase of the educational services is the program of individual study through the medium of correspondence courses and courses available through the United States Armed Forces Institute. This Institute is an official agency of the Army and Navy Departments to provide services and materials for study by Service personnel at a minimum cost. Besides study courses directly under the Institute, one may also enroll for extension courses from any one of a number of civilian colleges and universities that cooperate with the Institute. Thus higher education from an accredited institution of learning is available to every man in the Navy who has the desire to pursue his formal education further.

The varied and extensive opportunities offered by the educational services provide the means whereby any one in the Navy can study a subject of his own choice under excellent guidance very inexpensively. The only vital requirement is that the individual bring an interest and determination to his study for its successful completion.

The Problem

The essential problem of this paper will be to determine what aspects of civilian training and education can be

applied to the best advantage, and in what situations, to the training needs of the Navy. In the foregoing discussion of the main trends the Naval training program is taking at the present time, it is obvious that certain basic principles of the civilian philosophy of education as it has evolved through the years could be of the greatest value. These basic principles will be examined with the idea of their valid application to the requirements of modern training in the Navy.

In order effectively to delineate the problem, it is essential that the title of this dissertation be specifically defined. By "training" is meant the acquisition and development of particular skills and abilities. "The Naval Service" by definition here shall be interpreted to apply only to the Regular Navy. When it is intended to refer especially to the reserve components of the Navy, they shall be so designated.

The educational services are considered here to be a part of the training program inasmuch as they constitute what really might be called "off-hours" study; the average sailor spends much time in a duty or stand-by status when he must be present and available, but is not actually occupied except when standing a watch or in an emergency. It is certainly a part of the man's training that he be taught to utilize such spare time both to his own advantage and to the advantage of the Service.

The approach to the discussion of the problem will be toward the end of providing the average Naval officer with sufficient information and background better to perform his training duties and to understand the educational and psychological implications of the training function. Too often the Naval officer is a man well versed in the technological aspects of his chosen occupation and profession, but altogether lacking in the academic approach to the fundamental problems of training. It is hoped that this paper may inspire at least some officers to read a basic text in education or a book dealing with some phase of the psychology of learning.

Summary and Conclusions

1. The old approach to the training function in the Navy was basically that of the apprentice system. In this era of new methods and machines, it must be realized that modern training must be systematic, thorough, and accomplished in a minimum of time.

2. The training needs of the Navy changed rapidly with the advent of the recent war, and the Navy was unprepared for the shift in emphasis from generalized training to the highly specialized training required by new inventions and techniques. Expert civilian advice was available to reorganize the training program, but it would be neglectful on the part of the Navy not to follow-up the successful training

methods used in World War II.

3. Training in the Navy is extensive and varied, but with four programs providing the major part of the whole function:

a. Recruit training is concerned mainly with teaching the new man to live in a line, military organization, and acquainting him with the possibilities that lie before him in his new career.

b. Service school training provides the necessary technical education in the various rates and at different levels of difficulty, depending upon the type of school. The problems of the operation of the service schools are fundamentally the same as those encountered by civilian educational institutions, and the Navy can benefit by the study of civilian methods.

c. Shipboard training is pragmatic in character, and depends to a large extent upon equipment and material to the neglect of basic educational principles in many situations. The Executive Officer is charged with the primary responsibility for training, but the onus actually rests on the department heads and on local leaders in different parts of the

ship; these people are frequently expert in their field, but may be almost completely untrained in the principles of instruction. Training on board ship must be decentralized for the best results; emphasis must be placed on the training program at the lowest possible level to be effective.

d. The training provided by the educational services is individual in nature, and must depend on the ambition and fortitude of the particular man to be meaningful. It is the duty of the commanding officer to see that information regarding the availability of this type of training is disseminated to all hands frequently and in detail. Individual guidance in the formulation of programs and objectives should be made available to enlisted personnel by the division officer, the training officer, or other responsible officer personnel.

4. The problem is to determine what parts of the civilian education philosophy and procedure can be adapted to fit the needs of the Navy's training program.

5. The definition of the title of this paper is, in paraphrase, "the acquisition of skills and abilities by personnel in the Regular Navy."

6. Naval officers, a major part of whose duties involve the function of training, are encouraged to read some basic texts in the field of education and psychology.

CHAPTER II

PRINCIPLES OF TRAINING

Introduction

At the outset in the planning of a training program it is necessary that there be a clear conception of the purposes that program is to serve; lacking an understanding of the purposes of the training program, it cannot be determined what materials will be utilized, what educational philosophy will be used, or what teaching methods will best suit the subjects to be learned.

It is recognized that training is a science, and as such must be approached through the medium of the scientific method. Basically, Navy training is in no wise different from civilian education; there are but few problems in the field that are not common to both. Hence, the training program in the Navy must agree in fundamentals with the concepts and principles that have been developed by psychologists and educators over a period of many decades. Neglect of these principles by the Navy could only mean that its training program would lack direction and method, and certainly the Naval Service has the obligation to the American public that the best available materials and procedures be employed in

every case.

Individual Differences in the Student

A vast and indeterminate number of factors operate to produce individuals, no two of whom can be expected to be alike. Differences in socio-economic and educational backgrounds, in innate intelligence, in aptitudes and abilities, in attitudes and preferences, all must be recognized and the Navy must be prepared to select, classify, and place the individual to the greatest possible advantage both to himself and to the Naval Service.

It is of course true that no one person or agency can determine with great accuracy just what another man is, or what he can do; there has never been a test battery developed that will give a complete profile of a man's personality, intelligence, and ability: it is probable that there never will be. The Navy must rely upon tests of various sorts, as indeed it should, but the results of these tests must be used only as indications that certain factors and traits may be present or exist. It would not be justified, however, to use test scores exclusively to the preclusion of intelligent placement and leadership. Tests are only aids to the solution of the problem of individual differences, and not the solution in themselves.

The training program must take these differences into account, and under conditions of great standardization

in teaching methods and mass production of supposedly trained men, this primary consideration is too often overlooked. The rate of growth of each individual is different from that of his mates, so that men cannot be expected to advance at the same rate. What the training program can do, is to assist the individual trainee to develop his own aptitudes to the highest possible degree so that he works at the maximum level of performance of which he himself is capable.

Generalizations on the subject of individual differences are quite useless except to observe that such differences do in fact exist.

> There are no scientific doubts about the existance of wide individual differences in mental capacities. Numerous curves of distribution have been published showing such variation with respect to almost every psychological process, as well as for a variety of physical and anthropometric measures. All of these curves, found experimentally, approximate more or less closely the well-known normal probability curve, and it is now the orthodox doctrine that human traits are so distributed.[1]

In the final analysis it will be the responsibility of the Navy school administrator and of the Navy instructor to deal with trainees as individuals; they must be trained to realize that there is no such thing as teaching a class, and that it is their job to see that the men under their tutelage are taught as individuals.

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[1]Frank S. Freeman, "Contributions to Education of Scientific Knowledge About Individual Differences," Thirty-Seventh Yearbook, National Society for the Study of Education, (1938), Part II, p. 406.

Differences in Education

The educational backgrounds of the persons in the training process vary widely in the individual; as a whole, the educational level of Naval personnel will tend to fluctuate with economic conditions which prevail in the nation. For example, in the Great Depression of the 1930's, no person was accepted for enlistment in the Navy who could not present evidence of graduation from high school. In periods of economic prosperity, it is to be expected that the educational level in the Navy as a whole will fall off somewhat.

The general level of education in the country rose considerably in the interim between the two World Wars; the average education of all white personnel inducted into the armed forces in World War I was that of the sixth grade, while in World War II the average white inductee had one or two years of high school to his credit. However, while it was estimated that in the second World War some 40 per cent of the white inductees had completed high school, about thirty per cent had not finished the eighth grade, thereby accentuating the problem facing the armed forces.[2] In post-war enlistments the educational level has not been quite so high; 85.8 per cent of the recruits left school at ages 15, 16, or 17. Only 17.1 per cent have finished high school,

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[2]Earl J. McGrath, "General Education in the Postwar Period," Annals of the American Academy of Political and Social Sciences, CCXXXI, (January 1944), p. 78.

26.6 per cent never attended high school, and 43.2 per cent have completed one or two years.[3]

The Navy enlisted man entering the training program cannot be treated like a high school student; he may not be able to read much better than a sixth-grader, his knowledge of mathematics may be limited to the ability to make change, his writing may be poor, and his spelling may be a little shaky on words of more than two syllables. It is probable that he will have an abhorrence of school and school-like situations; if men like this are treated as high school students, they are sure to be resentful.

Notwithstanding these considerations, there are about three chances in four that a man enlisting in the modern Navy will stand in need of technical or specialized training. General Somervell, Chief of the Army's Service of Supply during the recent war, estimated that 63 out of every 100 men inducted into the Army in the war period were assigned to duties requiring specialized training.[4] The Navy need for specialized training is far greater, owing to the greater number and variety of highly specialized mechanical and electronic devices. It cannot be expected that the need will ever decrease.

The safest attitude the training program can adopt toward the trainees is to assume they know very little, are

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[3]Bureau of Naval Personnel, Research Activity, op. cit.

[4]Lieutenant General Brehon B. Somervell, "Pre-induction Training," an article in Occupations, XXII, (October, 1943), pp. 24-26.

not particularly skilled in the use of their hands, and that in general they are not eager to have anything to do with any situation that resembles the old-fashioned school. It is safe to say that the average newly-enlisted man has ambition and wants to advance in his new career; to this end he has a definite inclination toward the practical, and he wants everything taught him to be pragmatic in nature.

When these known attitudes and preferences of the men are coupled with their widely varied educational backgrounds, it becomes apparent that the individual level of education in the case of each man becomes important both to the instructor and to the supervisor in the training program. The educational background of each man must be adjusted to the beginning level of each course of instruction, and there must be the realization that the progress of each man will depend to a large extent on his previous background.

In a recently stated policy, the Navy Recruiting Service has made a realistic move to attack this problem by means of a long-range program of cooperation with civilian educators and educational institutions; not only will this new policy undoubtedly receive the active support of educators, but it will form the basis through public relations for continued understanding and mutual endeavor along these lines.

Educators generally are interested in keeping youth in schools as long as possible. The Navy is also

> interested in this as, other things being equal, the high school graduate is the ideal recruit. This would also relieve the Navy of an outside task (providing high school education) which it has undertaken only by default. The interest therefore is mutual and students would be encouraged to graduate. Thus should the recruiting service be approached by some youth whose problem is such that the school could meet it, if it knew the full story, it might well be the counsel to call these students to the educators' attention for action, and jointly agree to work together to postpone his enlistment for the time being.[5]

Differences in Ability to Learn

In addition to the influences exerted by previous educational experience, the progress of the trainee will depend markedly upon his individual ability to learn. Learning is a word applied rather loosely in many situations, and it is not at all certain that the true nature of the learning process is understood by the average person or the Naval officer who may one day find himself in the role of a Navy school administrator or instructor. For the purposes of this paper, learning will be defined as follows:

> Learning is a process which results in a change in the behavior of an individual brought about by action taken in response to a felt need.[6]

The word "behavior" is used here in its psychological

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[5] The Naval Recruiter, Vol. 3, No. 1, The Recruiting Division, Bureau of Naval Personnel, Washington, D.C., (January, 1948), p. 5.

[6] James Harold Fox, Charles Edward Bish, and Ralph Windsor Ruffner, School Administration, Principles, Procedures, The George Washington University, The School of Education, (Washington, D.C., November, 1947), p. 22.

sense, and covers the psychological functions of perception, emotion, the thought processes, and includes the motor functions. The word "felt" modifying the word "need" implies that motivation and its attendant forces are operating. This definition includes learning processes ordinarily found in training programs in industry, and would certainly apply to like programs in the Navy. Such basic processes are (1) development of motor skills, (2) acquisition of knowledge, and (3) the special process of memorization. The subject of learning and the learning process is one about which much has been written; it is also a field of controversy for many present day educators and psychologists. A list of some of the terms used with all their nuances of meaning would occupy several pages; it is considered sufficient for the present purpose to restrict the discussion to the most important psychological processes influencing three basic kinds of learning specifically delineated under the definition.

Education may be defined as the growth or progressive development of an individual; such education takes place through the learning process. The growth or development of the individual is two-fold: physical and mental; these two aspects must be considered together, for mental growth cannot take place if the organism is not physically ready for such growth. For example, a baby cannot walk until he has reached the point of physical strength necessary for walking. Thus learning is limited to the stage of maturation

that the individual has attained. By the same consideration, one cannot assume that because a person did not finish the sixth grade he cannot therefore be trained as a firecontrolman, for instance; his development since he left school has progressed so as to push his potential learning limits far above where they were at that time.

To be effective, learning must be purposeful; man is by nature a creature interested in attaining certain goals and thus conforming to social pressures. These goals are both biological and social, and it is the social goals that determine to a great extent what objectives the individual shall pursue. As we have seen, this is particularly true of the Navy enlisted man; he is usually interested only in training that has a real, immediate objective. He has no interest in information and learning as such, but only insofar as he can see the attainment of a goal whereby he can advance himself in his own eyes and in the eyes of others--his shipmates, friends, or relatives. Consciously or unconsciously, the man will from time to time evaluate his progress in these terms, and the Navy training program must be able to point a positive answer if training is to remain meaningful to the man. Once the program has lost the immediate objective in the eyes of the man, his level of aspiration will decline, his motivation will also disappear, and with motivation is connected the prime mover in the whole process of learning.

Learning must take place with relation to what the student already knows; it must "tie-in" with the whole and be considered a part of the context or entire pattern of the man's knowledge. It should result in a functional understanding.[7] Specific information given the learner should be supplemented by general inferences whereby that new information could be applied and used in other situations. Particularly is this principle true in adult education and in vocational training, both of which characterize the Navy training problem; the men have little interest in subject matter for which they cannot see an immediate, practical, and functional application. The new must be built into the framework of the old.

It is well known that social and physical environment exert tremendous influences on the learning process. In addition to the social pressures discussed above, it is obvious that personality factors and social relations in the learning group interact to form attitudes that may be either helpful or detrimental to the learning of the individual student. The resolving of problems in this area are to a great extent the responsibility of the instructor; teacher enthusiasm, initiative, and resourcefulness in human relationships are of the utmost importance in the learning process. Interest evinced in the student by the

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[7] Ibid., p. 31.

instructor, and sympathy with the problems which confront him will do much to establish him on a firm basis in the group. Personality clashes at this level are not inevitable; they may be solved or avoided by intelligent interpretation by the instructor of the needs of the student. The majority of all learning takes place in group situations through interaction of the group, and the student that is at odds with the group or who cannot get along with the instructor is at a serious disadvantage.

The physical environment of the classroom or the shop also has its influence on the learning process. It is axiomatic that the working space be kept clean, uncluttered, and free of materials that tend to distract attention. The surroundings should be suitable to the learning taking place; they should approximate as closely as possible the actual situation where the learning will be used empirically. All materials used, whether in class or in a shop, should be checked out and returned systematically, so that the men will develop a sense of responsibility for their gear and tools. Bulletin boards, pictures, and visual aids must be kept current and meaningful to the situation at hand. Ventilation must be adequate, and the temperature constant; between sixty-five and seventy degrees Fahrenheit is considered optimum. Light should be evenly distributed; both glare and dark places in the field of vision are to be avoided if at all possible. Seats should

be arranged for every man to be able to see and hear everything presented; experience will determine the best arrangement for the particular classroom or shop. It has been shown that greater rapport exists between the students and the instructor when seats are arranged in a semi-circular fashion. Color, too, is important in the physical scheme; the color system should be harmonious and inconspicuous, preferably in pastel shades. Because of its restful effect on vision, green is recommended. Accident hazards and dangerous moving parts of machinery should be painted a bright, distinctive color. Noise, while admittedly distracting in some situations, does not have the extremely detrimental effects popularly supposed; although a quiet and noisefree atmosphere is very desirable, it has been demonstrated that noise in moderate amounts is not particularly deleterious.

Motivation and Learning

Motivation may be defined as a group of incentives, physical, psychological, or social, which persuade an individual to a certain behavior. In the Naval situation, in the main, it may be assumed that physical needs are cared for, as persons with congenital or chronic defects are not accepted for enlistment, and the Navy man is under constant and competent medical and dental care; likewise, he does not suffer from other common drives, such as hunger, thirst, and lack of sleep. It is therefore the social and psychological drives with which the training program must be most concerned.

Motivation does not arise without cause; it is, in general, the product of an emotional tone which may be either pleasant or unpleasant. The emotional tone sets the attitude of the learner in relation to his felt needs; this need, translated in terms of a tangible, attainable goal sets up an earnest desire for achievement. Of course, it is also true that if the emotional tone is negative in character, there follows instead of a desire an antipathy or repugnance and then negative motivation exists. The most efficient learning takes place when the student has a strong desire to achieve an actual, significant goal. His reasons for this desire may be many and varied: future security, recognition, monetary remuneration, social or professional distinction, all these are factors which may motivate an individual to attain a goal.

It must be emphasized and iterated that the learning process varies with individuals; many factors are operative that cannot be readily discerned, as for example educational and social background, experience, and mental ability. It must be remembered that while learning is very often a group process, great differences exist in the individuals of the group to learn and assimilate.

Differences in Curricular Attack

In general, it may be stated that there exist in the field of education two basic philosophies, the traditional

or subject method, and the organismic or project approach. These two concepts, as apparent in their very names, are almost diametrically opposed in their respective beliefs. It cannot be maintained that one is by its nature better than the other in all or most respects; there is little question, except to the more rabid proponents of each, but what either may be validly used depending upon a number of variables such as subject to be taught, age of the group, and the objectives of the course. In the last twenty years there has been an ever-increasing trend from the traditional, formal approach to the progressive school of thought. The noted philosopher and educator, John Dewey of Columbia University, has long been a very active supporter of this latter theory, and in recent years it would seem that the project method supporters have forged materially ahead of their opponents. In present-day education the organismic method is wide-spread and is taught in a great many of the foremost schools of education in the country.

In order more clearly to evaluate a curricular approach that would best answer the training problem in the Navy, the basic beliefs and claims of each philosophy will be examined in more detail.

The Traditional Approach

The most common example of the traditional approach in education is the three "R's" of the days of the little

red schoolhouse; this method of teaching broke the curriculum into its component parts and taught each part as a separate subject. Each subject was analyzed in the traditionally formal style, and little if any attempt was made to correlate the various parts of the curriculum to give the pupil a sense of the whole. This is the so-called "part" method. Its supporters claim that a basic grounding in classical and traditional education is necessary in the development of a well-rounded, educated person, and that somewhere in the process the individual will himself become aware of the inter-relationships existing among the subjects he has studied.

Education under this analytical approach is of necessity centered on the teacher; it is, viewed from a certain perspective, an undemocratic system. The teacher may be likened to a miniature dictator directing the class in the desired direction, and ordering that a certain progress be made each day or week. The pupil is entirely under the personal control of the teacher and dependent upon him.

The critics of this system maintain that one of its fundamental defects is that it creates an artificiality of both task and purpose; the objectives are artificial because no functional application can be discerned by the student and because the subject matter is not given in context. In other words, the new subject is not related to what the pupil already knows, and therefore is not meaningful until

some indefinite time in the future when he is able to correlate the various subjects he has studied. This approach lends itself to "cold-storage" learning; that is, learning stored up at the present for use in the unforeseeable future.

This method in its pure form cannot be considered applicable to the training needs of the Navy. As discussed previously, it is known that enlisted personnel in order to be properly motivated must be able to see purpose and practical application in the teaching situation; many are repulsed by anything suggestive of formal schooling. While this reaction is certainly not endorsed, things must be faced realistically and as they exist. The loss of motivation alone that would result from the adoption of this method makes it impracticable.

From the point of view of the training administrator the subject method has still another disadvantage. It is perfectly true that certain of the more difficult and technical of the Naval occupations require a good knowledge of curricular subjects such as mathematics and physics, but assuming that these subjects were taught in their pure form the trainee might well have a solid grasp of the subjects and yet not have any practical ability in a rating group, whether it be electronics, fire control, or radar. If this method were in force in the Navy training program it would have to be supplemented by a rigorous on-the-job training in order for the service school graduate to learn the

application of the subjects he mastered in school to the actual job.

Although it is obvious that the traditional method cannot be used in its entirety in the training of the enlisted personnel of the Navy, it should be equally obvious that some aspects of the method can be used to good advantage, particularly in subjects where learning is aided by organization of material and method. These would include mathematics, electrical theory, physics, and the like. Subject teaching is a natural complement to the project method, and as such is an important adjunct to the training program.

The Project Method

The project method is the outgrowth of thought and study on the part of those who claim to be of the progressive school of modern education; Dr. John Dewey characterizes and defines progressive education in the following way:

> The rise of what is called new education and progressive schools is of itself a product of discontent with traditional education. In effect it is a criticism of the latter. . . . .
>
> If one attempts to formulate the philosophy of education implicit in the practices of the newer education, we may, I think, discover certain common principles amid the variety of progressive schools now existing. To imposition from above is opposed expression and cultivation of individuality; to external discipline is opposed free activity; to learning from texts and teachers, learning through experience; to acquisition of isolated skills and techniques by drill, is opposed acquisition of them as means of attaining ends which make direct vital appeal; to preparation for a more or less remote future is opposed making the most of the opportunities of present

> life; to static aims and materials is opposed acquaintance with a changing world.[8]

From this definition it is clear that the newer method of education places emphasis upon centering the whole process on the pupil. Like traditional education it is a group teaching situation, but the interaction of the individuals within the group is stressed rather than the pupil-teacher relationship; the immediate purpose is the development of self-dependence in the student. Another authority in the field has defined the objective of the progressive method more explicitly:

> Uniform lesson assignments, uniform grade requirements, and rigid curricula must give way to individualized instructional methods, individualized methods of learning, individualized programming in a diversified curriculum, and individualized rates of progress where each pupil preserves his self-respect through mastery and success, where he competes only with his past record, where he finds equality of opportunity to develop his abilities and attitudes, and where his goal is the complete development of his powers for a good life as well as a good living.[9]

The controversy of educational philosophies is at times a bitter one, and it may perhaps be true that this statement of objectives is somewhat idealized; however, it must be admitted that the statement contains many ideals that could have valid application to the Navy training

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[8] John Dewey, Experience and Education, (New York: The Macmillan Company, 1947), pp. 4-5.

[9] William H. Johnson, "Individualizing Methods of Learning," Chicago Schools Journal, 20: 48-49, (September, 1939), quoted in Eugene A. Waters, A Study of the Application of an Educational Theory to Science Instruction, Bureau of Publications, Teachers College, Columbia University, (New York, 1942), p. 13.

program. Particularly is this approach valuable in the light of individual differences and on consideration of the varied educational levels of the men to be trained in the Navy. The idea of allowing the men to progress at a rate determined by their independent abilities and like variables is attractive; not only would this lead to an increase in motivation in good students, but would tend to eliminate those unsuited to the particular type of training for one reason or another. In effect, the result would be a system of natural selection.

The chief objections to the use of the project method to the exclusion of others are three-fold: first, it would be easy to train a man in a certain job or occupation without giving him sufficient information in the underlying fundamentals and principles of that occupation. Second, the project method of teaching the "whole" requires a great deal more room and equipment than the subject method; third, there is no question but that this method necessitates more and better teachers. Instructors are required to be more highly trained because of their greater activity in the teaching situation; there is a divergency of duties that must be performed in the classroom or shop. Working with individuals means that human relationships would be of more importance than ever; the instructor would have to be a technical expert in every phase of his particular field, for he would be teaching the whole job rather than specific parts. Then

too, one instructor cannot handle as many students in this mobile plan as a teacher who simply lectures to a large group of people. In the latter case, the addition of a few more students makes little difference, whereas additions to the class of the project teacher increase the size of his job proportionately. Although conditions vary, of course, the project teacher in a situation similar to that of the Navy cannot be expected to take more than about fifteen students.

A Combination Approach

It is believed that the optimum approach to the training problem in the Navy will be found in a proper choice of the best features of the two methods discussed above. A limited use of the subject method would teach the fundamentals necessary for a basic understanding of a job or occupation, while the major part of the learning process would be carried on project arrangement. For example, in a school for the instruction of radar, the project collocation would be a shop or laboratory complete with actual radar sets upon which the men worked and learned; sooner or later the question of electrical theory would arise, whereupon classes in mathematics and physics would be organized in order to bring the men to the level of knowledge in these subjects necessary for the understanding of the practical work to that time. These classes need not be scheduled in advance, but only on indication that the

men had reached a point where such classroom study would have real meaning.

Another example of a combined approach is to be found in the modern apprenticeship method. The apprentice works at his chosen trade a certain number of hours, and spends the rest of the working day in class studying fundamentals necessary to that trade. The advantages of this apprentice system are immediately apparent when compared with the Navy "striker" system; the striker may learn his trade from his association with rated men, but it is probable that the knowledge of fundamentals does not come until the striker has gained proficiency in the trade. The apprentice reaches a comparable proficiency much sooner because he receives the practical and the theoretical concurrently.

One of the better known plans for the use of this combination method was developed by Dalton. In the Dalton Plan differences in the rate of learning are adjusted by having a part of the class engage in laboratory or seat work, while the part of the class that needs special work engages in discussion and recitation. This feature has proved to be successful in a large number of cases, but is generally used only as an emergency provision. Basically, the Dalton Plan provides for the mastery of a certain block of subject material, and the use of alternate teaching techniques is designed to bring all students up to the

same level of learning and ability. It may be said of some of the minor aspects of the Plan that it does develop a certain amount of pupil self-reliance.[10] It is believed that in a modified project method such as might be used in the Navy, the Dalton Plan very definitely could be used to advantage.

It is submitted that the foregoing discussion of the combination approach to the question of educational philosophy is the one that best answers the need of the Navy with regard to the majority of its training problems. One of the chief advantages of the method lies in its fluidity and the ease with which it may be altered or adjusted to apply to specific situations. It may readily be seen that different rating groups present altogether different needs, and it is not feasible that one rigid approach could possibly prove to be a panacea. Not many years ago a teacher at the beginning of his career developed a technique of instruction and adhered to it; it is now recognized that so complex a field of endeavor cannot possibly be challenged with a single procedure, and it is highly necessary for the modern teacher to be equipped with a number of techniques with which to meet the varying demands and values of a changing world.[11] In just such a manner has the fundamental question of

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[10] Charles Elmer Holley, High School Teachers' Methods, (Champaign, Illinois: The Garrard Press, 1937), pp. 130, 170.

[11] Ibid., pp. 4-5.

philosophy evolved to the point where a single approach simply cannot meet the need.

Differences in Methodology

In the choice of a particular technique for teaching, the nature of the subject matter to be presented is the primary consideration. There are, of course, great differences in methodology; some are basically different, but the majority are variations and modifications of better known and more wide-spread techniques. Many are generally usable; others are designed for use with a complete unit or block, and still others are strictly limited to very specific situations. It is proposed to discuss several teaching methods which might have wide applicability in the Navy training program.

The Lecture Method

The lecture method is probably the most common of all teaching techniques; it consists of an oral presentation by the instructor, with his enlarging on the subject material by explanation and expansion. The advantages of this method are fairly obvious: it permits the presentation of many ideas in a short space of time, more pupils can be accommodated thus requiring fewer teachers, and it combines readily with other methods. The disadvantages are not quite so apparent: many people are not accustomed to sitting quietly and listening intently for periods of time, the pace is often too fast,

it is difficult to avoid unfamiliar thought and wording when presenting new material, and finally, its greatest drawback is that motivation is often at a minimum because of the non-participation of the students. The lecture method is best used for short periods of time, and is especially useful in the introduction of new material. In the Navy, lectures should be held to a minimum in shop training, while they can be used to great advantage in training administrative and clerical ratings, such as yeoman and storekeeper. The lecture method does have its place as an integral part of instruction, but it does need care to prevent its becoming ineffective.

The Directed Discussion

Included in this method are such variations as the question and answer procedure and the recitation-discussion method. In a directed discussion the teacher acts as a group chairman and guides and stimulates the discussion in the desired direction. When unfamiliar material is broached, the question and answer aspect of the method is emphasized, and may be combined with recitations. The responsibility of the instructor is to keep the discussion centered around the theme as well as to have prepared stimulating questions before the session. This method stresses individual thought, aids in the development of leadership, and contributes to the growth of initiative. It is inexpedient, however, in that it is time consuming, and tends to be dominated by the

best students; it is not applicable to large classes, and it may lead toward confusion if not very cleverly led by the instructor. In certain instances the directed discussion may be used to some avail, but it is not conceivable that it should have a wide use in the Navy. In this connection it is considered that its disadvantages outweigh its advantages, particularly in view of the fact that its correct use requires the presence of very experienced teachers in order to be effective.

So similar in nature to this method is the conference that it can be discussed under the same general heading. The conference is a technique that is particularly suited to the teaching and training of personnel on the higher level and to advanced students. Almost all the comments pertaining to the directed discussion apply to the conference as well, but the conference tends to be a little more informal because of its advanced nature. It is certainly not a procedure that should be used in the training of recruits or low-level personnel in the Navy; it is doubtful that it should have general application in the Class "B" and "C" service schools. Conference training is used in industry for supervisory personnel and executives; its use in the Navy should be similarly limited. There have been certain precepts evolved that should be observed in the conduction of conferences; most of them are not absolute, but better results will follow if these rules of thumb are observed where possible.

1. The material to be assimilated must be adjusted to the intellectual level of the group as a whole.

2. The persons in the group should be of the same general intellectual level.

3. If at all possible, limit the number in the group to about fifteen persons. Too many people make the conference cumbersome.

4. The agenda of the conference should be promulgated in advance of the meeting so that the participants can be familiar with the material to be covered and can have done some thinking about it beforehand. However, this does not mean that the agenda should be inflexible; a certain amount of latitude should always be allowed for interests to develop.

5. Do not allow the conference to become too general or to stray from the central theme. Use concrete examples of instances under discussion.

6. It is essential to have continuity from one conference to another; when starting a conference the previous meeting should be summarized and the conclusions stated.

7. The leader or teacher of the conference is of the utmost importance; he must keep the objectives in mind, and should be well trained in procedure. He must participate, prod, and lead; he must never monopolize.

A clever conference leader can unobtrusively guide a group in the right direction through skirmishes of discussion that will hold interest and stimulate motivation far

more effectively than the pure lecture method. For this reason the conference can be a vital part of the training program that the administrator cannot afford to overlook.

Group Performance Method

In group performance the trainees are divided into a number of groups with the instructor acting as a supervisor of the learning activity. This provides for purposeful "doing" by the individual student, and people learn by doing far more than they do by listening or observing. This method is, of course, a feature of the project approach to education; it has the advantages of being a better motivated type of learning, it stimulates competition, it builds teamwork and leadership qualities, and the students can easily observe and evaluate their progress. This method presumes that the students have been made familiar with the process or subject under study before coming into contact with the "doing" activity; in other words, this method is best used in conjunction with a more formal style of teaching.

The disadvantages of group performance are almost identical to those of the project philosophy; the need of close supervision demands more teachers, and the intelligent disposition of the various learning groups demands sufficient equipment.

Closely allied to group performance is the laboratory method which stresses even more strongly the practical application of theory. It is a system of instructing that plans

for the student to perform certain prescribed operations for the purpose of developing certain skills and arriving at certain conclusions. It perhaps places more emphasis on the individual than the group performance method, but its advantages and disadvantages are practically the same.

These methods are especially well suited to Navy training; not only are they applicable in the shop for the training of machinist's mates, machinery repairmen, various aviation ratings, et cetera, but also in the paper-work laboratories to train ratings such as disbursing clerk, personnel man, and aerographer's mate. The needs of the Navy demand that instruction be directed toward the job to be done, and it is highly desirable that the training situation approximate as closely as possible the job situation aboard ship or in the field. To this end, training that employs group performance and laboratory methods is the most significant. However, it must be reiterated that the particular method of teaching must be adapted to the specific instance, and that various teaching methods can be used with benefit to supplement the performance type of instruction.

The Use of Aids

Strictly speaking, all aids should be designed to be used as extensions of the curriculum; they should enlarge and expand on the course of study already set up. The

intelligent use of aids can add much effectiveness to the techniques of the average instructor, but it should be remembered that aids are not substitutes for good teaching.

In civilian education textbooks are one of the most useful aids the teacher has; in the Navy, the instructor should be extremely careful in his use of textbooks. He cannot expect that the reading ability of the trainees will be much above that of sixth graders, and at this level it is difficult for the student to benefit much from reading a text, especially if the subject is technical in nature. Considering the peculiarity of many Naval subjects when compared with general education, it is by no means certain that standard texts will be available; frequently Navy texts are written for particular courses by persons not well qualified for such a specialized assignment. For reasons such as these, the use of textbooks for the lower levels of instruction is not recommended. Supplementary reading of a suitable type covering material already taken up in class is about as much independent work in this field as the instructor can expect from the average Navy student.

The use of audio-visual aids in training was much exploited during the latter part of the training program of the recent war, and the Navy has learned to depend heavily on the assistance of this type of aid. The correct

use of these aids will greatly facilitate the job of the instructor, especially when introducing new material to a class. However, it must be repeated that aids cannot be substituted for the job of teaching, and much time can be utterly wasted in showing films or playing records that are inappropriate or in using them without properly preparing the students.

Certain general rules and safeguards for using aids are considered of sufficient importance to warrant their inclusion:

1. The instructor should see the film, hear the recording, or examine the model, and consult the accompanying study guide. Full understanding of the aid will enable the instructor to make use of it at the right time and in the proper manner.

2. The instructor should check on the operation and state of repair of the equipment before bringing it to class; he should obtain trained help if it is indicated.

3. The instructor should tell the men why they are being shown the aid, what they are expected to gain, and how that knowledge applies.

4. The instructor should use the training aid as the central part of his instruction for that class period.

5. The instructor should summarize what has been shown, invite questions and comments, and provide for actual use of the information gained. At some time soon after, the

men should be tested on what they have seen.

Impressions received through the sense of sight are much stronger than those received through any other one sense, and it is because of this that visual aids have such an important part in the training program. A large part of Naval training is very technical and much of it is difficult for the new man to grasp; training aids provide for teaching the quickest, simplest, and most effective way when they are properly used. In the war period, the Navy extended the use of visual aids tremendously, so that there is scarcely a rating for which such aids are not available. The U. S. Naval Training Bulletin, published monthly by the Bureau of Naval Personnel, lists new aids as they become available and directions on how to obtain them.

Summary and Conclusions

1. The objectives of a training program must be made clear and concrete so that the best applicable educational philosophy and methodology may be brought to bear on its problems. Training is a science, and so must be approached through the medium of the scientific method.

2. The training problem is complicated by individual differences in the students; some indications of these differences may be gained through a testing program, but test scores can never be regarded as final. Differences in educational background are great; the men must be brought to a nearly

common level of learning in a training course, and the onus of this responsibility will devolve principally on the Navy instructor.

3. Individual differences in the ability to learn further complicate Navy training. It cannot be assumed that Navy instructors or school administrators will be educators or psychologists, but a certain minimum understanding of the processes of learning is vital to their success.

4. Education is both physical and mental, and it must be purposeful and functional to be effective. Present learning must be related to past experience, particularly in the Navy situation where it has been repeatedly demonstrated that the men have little interest in "pure" learning. Social and physical environment cannot be overlooked, for they exert great pressures on the learning process.

5. Incentive or motivation must be present before effective learning can take place. Motivation usually stems from a combination of many factors, and tends to control the individual behavior. Naval personnel are relatively free from the basic drives such as hunger and thirst, so that their motivation rises from social and psychological needs. The individual's level of aspiration and desire to attain a certain goal must be stimulated before learning can have a meaning and purpose to him.

6. There are two basic approaches to the development

of a curriculum: the traditional and the progressive. The traditional method teaches that the curriculum must be separated into its component parts and the subjects taught individually, and learned in "parts." The progressive method is to attack the project as an entity and to relate all parts to the "whole."

7. The best curricular plan for the Navy training program is a combination of these two plans; most Naval subjects can be taught in the project situation, but should be supplemented by teaching enough of the component parts to give the trainee a thorough understanding of fundamentals. The combination approach has the great advantage of teaching both the theoretical and the practical.

8. There are many techniques of teaching, but the teaching method used should be adjusted directly to the subject matter. In general, the laboratory and group performance methods will predominate, but will be supplemented by lecture and discussion in the study of fundamentals.

9. Teaching aids should be used as extensions of the curriculum, and not as ends in themselves. Textbooks may be used in the Navy, but their use should not be emphasized. Audio-visual aids used correctly can be of tremendous value in the Navy. Not only can they help the instructor in his job of teaching, but they also present very technical and difficult material to the student in the simplest form. It must be iterated that training aids add to good teaching: they do not substitute for adequate instruction.

CHAPTER III

EVALUATION OF TRAINING

Introduction

The final phase of any educational or training program has to do with the evaluation of progress in terms of the original objectives. Such evaluation is necessary from two points of view: (1) in order for learning to be effective, continuing appraisal is imperative, and (2) teaching procedures demand unremitting appraisal to insure that the students are learning.[1] In other words, the teacher stands in constant need of supervision and the results of teaching in constant need of evaluation. The function of the school administrator or supervisor is really three-fold in nature: evaluative, remedial, and motivational.

Evaluation may be either formal or informal, and the usual practice is to employ both forms. Formal, or quantitative evaluation, is carried out through an objective testing program designed to ascertain what knowledge the student has, or what level he has reached.

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[1]Fox, Bish, and Ruffner, op. cit., p. 91.

Informal, or qualitative evaluation, is concerned with subjective supervision on a more personal plane. Interviews, conferences, and inspections are used to determine whether teaching procedures and environment are conducive to the learning process. This type of evaluation requires great ability in the supervisor; he must be a man whose professional stature and experience enable him to analyze a situation quickly and accurately, and to come to a sound decision. In the event of unsatisfactory performance or results, he must be able to judge the actual cause, and not mistake symptoms for the disease, as is so easy to do. The supervisor must be aware that he sees most of his teachers and their students under conditions of some tension or stress; very often the person with whom he is working is understandably anxious or disturbed, and this of course complicates the conditions of analysis and judgment.

Remedial supervision closely follows evaluation; after a decision has been reached concerning faulty or incomplete instruction, the supervisor must know how to apply corrective measures. No stereotyped, formulated procedures can be gainfully employed in such cases; each person must be accepted as an individual, and his problems worked out separately.

Motivational supervision entails the administrator knowing what is necessary for the improvement of the school or system, and then being able to get his personnel to carry

out his wishes and recommendations. Many factors are involved in this motivation by the supervisor, such as a thorough knowledge of personalities, adaptability to varying conditions and situations, and a sound background in the psychology of behavior.

Navy schools differ not at all from civilian institutions in the need for effective evaluation of teaching and teachers, and remedial and motivational supervision by the Navy administrator may be expected to result in a better quality of instruction. However, it is suggested that the theory and practice of evaluation and supervision be carefully studied by the Navy school administrator prior to his venturing into this field, for it is certainly one of the most difficult aspects of a difficult profession.

Formal Evaluation

Test construction and administration is a highly technical process, the purpose of which is to discover or measure the present knowledge or achievement of the student, or to attempt to reveal any weaknesses in order that they may be remedied. In former years the testing program was pursued solely for the purpose of assigning grades, but it has come to be realized that a more effective and realistic purpose is to aid the student. Not only is the student being measured in a test situation, but also the teacher's ability as an instructor. Persistently poor results from

tests may indicate an inadequacy of school organization or curriculum, both of which are completely beyond the control of the student.

The three types of tests that should find wide use in the Naval situation are aptitude tests, diagnostic tests, and achievement tests. There are, of course, many more classifications of tests but for a training program planned to the needs of the Navy these three are considered sufficient. The great complexity of the testing field with its many ramifications and details, both of construction and administration, make it quite obvious that the Navy training program will benefit over a period of time by the use of a working minimum in the test field. It is not at all probable that the professional officer or man will have any knowledge of the technicalities of testing, such as reliability and validity, and consequently any large scale use of standardized tests demand the services of competent consultants.

Aptitude tests have a valid use in the Navy. At the time of recruit training such tests are administered to all new enlistees and the results are used as a basis for selection of candidates for the various service schools. The instructors and administrators of these schools should be aware of the implications of these aptitude test scores, and should be prepared to use them. Each man's scores are entered in his service record and on his individual qualifi-

cation card, both of which accompany him to his various duty stations. Aptitude scores must be used for what they really are, namely as indications that certain qualities and abilities may be present in certain persons. One of the leading authorities on aptitudes phrases the problem this way:

> Aptitude is a present condition, yes, but with a forward reference. It is a condition or set of characteristics regarded as SYMPTOMATIC, indicative of potentialities. It should nevertheless be apparent that in measuring a persons's aptitudes we are not undertaking to place a yardstick against some mysterious intangibles. . . . . A test of aptitude samples certain abilities and characteristics of the individual as he is today. It helps to find out what he can do now and how well he can do it.[2]

It will be noted that Bingham introduces the concept of time into this statement. While it is undeniably true that a person's aptitudes and potential capabilities may alter with the passage of time, Bingham proceeds to point out that such alteration cannot conceivably occur outside certain limits which it may be possible to delineate.

> A theory of aptitude must not assume that each of the factors determining a person's traits is constant in the sense that it will not alter, more or less, with time. We must, however, assume--if the concept of educational and vocational aptitudes is to have any meaning at all--that the changes which undoubtedly do take place in the relative potency of these factors are seldom sudden, and that they occur WITHIN LIMITS which can often be ascertained in advance.[3]

Navy school administrators should develop a working

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[2]Walter Van Dyke Bingham, Aptitudes and Aptitude Testing, (New York: Harper & Brothers, 1937), p. 22.

[3]Ibid., p. 33.

knowledge of aptitudes and aptitude tests, and must be capable of intelligent interpretation of aptitude scores. Correctly used, these scores would be of great aid in assigning men to the different occupational ratings. That the men need help in making this choice is evinced by the fact that in a recent survey 42.6 per cent of new recruits had no idea what rating they wanted to enter.[4] There is some evidence that many men eventually find themselves in ratings they have little interest in, and in some cases, that they actually dislike. A small sample survey conducted by the author and a colleague disclosed that discounting the middle, or "No opinion" group, as many men were in ratings they did not choose as there were men in ratings of their own choice.[5] It is believed that much misplacement of this kind could be obviated through a wise use of information gained from the aptitude tests now in use in the Navy.

Diagnostic tests should be used at the beginning of the training course to discover what the individual student knows before instruction begins. They should be used as an aid in the location of individual differences and in order to make the instructor aware of his job with relation to each individual student. In a good training program, these

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[4]Bureau of Naval Personnel, Recruit Survey #1, op. cit.

[5]Commander John E. Lee, USN, and Lieutenant Commander Walter E. Scott Jr., SC, USN, An Attempt to Discover Why Men Are Not Re-enlisting, unpublished survey, April, 1948.

differences are reconciled in the light of the individual ability of the student; as a means to this end the diagnostic test is an invaluable teaching aid. With regard to the construction and complexity of the diagnostic test, it should be exceedingly thorough if it is to be any good at all. In order that diagnosis be accurate, the test must be as comprehensive in nature as it is possible to make it. Only in this manner can weaknesses in individual students be revealed, and areas for intensification of study be outlined.

Achievement tests are designed to measure attainment or progress, and are not so comprehensive in nature as diagnostic tests. The achievement test is a sampling of knowledge or ability, rather than an area-wide examination. The achievement test is more like a rifle shot technique, whereas the diagnostic test may be more aptly compared to a shot-gun blast.

There are many forms and types of achievement tests that may be used; it should be apparent that certain types of these tests adapt more readily to certain methodologies and curricula. Two main divisions of achievement tests are the non-written, or performance type test, and the written examinations of various sorts. The performance type test is better to test shop or laboratory skill, while written tests lend themselves better to the testing of knowledge and attitudes. This is by no means a hard and fast rule; shop trainees can easily be given written tests, and mathematics or accounting students can be tested on their ability to perform

experiments and problems. Each situation will determine to a great extent what particular approach to the testing question should be taken.

Performance Tests

There is no one definite way to give a performance-type test; it is usually given to measure manipulative and mechanical skills as well as knowledge. For this reason, as indicated above, it is more adaptable to shop or vocational training. The purpose of the test and the quantities or knowledge it is planned to measure should be firmly fixed in the mind of the instructor; he must make sure that the test is given in exactly the same way to all students, and that each student is marked on the same basis.

A common failing among a great many instructors seems to be the notion that a performance test can be given at any time and with little preparation; this is most certainly not the case. The performance test is a valuable instrument, but its administration must be meditated and thorough. There are certain considerations necessary for the successful employment of this type of test. The Navy use of the performance test is largely in connection with vocational training; to avoid confusion, the following basic rules should be given careful thought in the construction of this test:

1. Design the test to determine to what extent the men have developed skill and knowledge to do the job for which they are being trained. What should they have gained

from reading? Lecture? Demonstrations and work they have done? What abilities should these men have as a result of training?

2. Test the tasks which best represent the significant degree of performance they should have attained. Can the men do the whole job, or just a part of it? Are the tasks the men are being tested on representative of the degree of skill deemed necessary?

3. Determine what features of performance on the tasks selected for testing will be used to judge good or poor ability. What standards are they required to meet? Do these standards adequately display the knowledge of the men? Are there definite points in the test on which concrete decisions can be made as to individual ability?

4. Determine the most effective, consistent, and economical way to give the test. How long will it take? How much equipment will be needed? Is the equipment organized and distributed in the best manner? What assistance will the men need? What specific directions are necessary? Are there adequate record forms or score sheets to insure that every man will be marked in the same way?[6]

If possible, it is a good idea to try the test out on a few advanced students or on some instructors; if this

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[6]Bureau of Naval Personnel, Test and Research Unit, Constructing and Using Achievement Tests, NavPers 16808, (Washington, D.C., 1944), pp. 4-5.

is not feasible, the instructor designing the test should take it himself, paying particular attention to the difficulty, the time required, and the equipment necessary. Very often in this manner defects will become obvious that are not apparent in reading the test.

If performance tests are to be used to the best advantage, it is vital that every man have the same equipment, the same directions, and the same opportunity; if this is not done, the test is not fair, and accurate comparisons between and among men are not possible. It is at this point that most failures in performance testing occur; it is absolutely imperative that the test be given to all groups in the same way, and that every student is marked on the same basis.

Written Tests

The planning and administration of the written test requires the same effort and care as the performance tests. There is a wider variety of written test available for the instructor to choose from; here again, the knowledge to be tested will be fairly indicative of the exact type of test to be used. The instructor will find it to his advantage to vary the kind of test given, for it is entirely possible for a group of students to become "test wise" if they experience one type of test too often.

The most common written examinations are the ones that find wide use in the Navy training program; it is not

considered necessary to discuss each type at length, but only to point out certain precepts that should be observed if the best results are to be obtained.

The multiple choice test is a good type that is readily adaptable to any subject matter. It may be used most effectively to present problems involving reasoning based on knowledge, and can easily be constructed so as to limit guessing to the barest minimum. There should be at least four choices, and not more than six; five choices are usual. The test constructor must be careful not to give grammatical clues to the correct answer; for example, the use of the articles "a" and "an." The choices should be listed, not written line by line, and the space for the answer should be clearly provided. If facilities are available to the instructor, the test can be made more interesting and challenging by the use of diagrams and photographs.

The matching test has its uses, but it is not as satisfactory as the multiple choice test which it resembles to some extent. The directions for each item must be clearly stated, and one question should deal with only one subject. It is not advisable to mix names, numbers, and dates; there should be more suggested answers than elements to be matched. This test is best used with technical material such as parts of a machine or steps in a process. If not carefully constructed, many questions may be answered on a common sense basis by the process of elimination; this is easier to do

than the instructor may suppose. Here, too, the clever instructor may liven up his test with pictures, charts, and diagrams.

The true-false test is the time-honored patriarch of all written tests; it is unusually popular because of its supposed ease of construction and administration. If its popularity rests solely on these factors, such popularity is undeserved because actually it is extremely difficult to make up a good true-false test. Because the test encourages guessing, it is perfectly possible for a weak student to make a score out of all proportion to what he knows. For this reason some instructors penalize the student for a wrong answer by deducting only half credit for questions left unanswered; this device, however, does not take into account the fact that anyone with a modicum of sporting blood will take a chance on a 50-50 proposition. The wording of true-false statements can be very confusing if not properly stated; words like "hardly," "usually," "sometimes," "all," "never," should not be used. They are either confusing, or they give an indication of the correct answer. The statements should be about the same general length, thoroughly mixed, and about half true and half false. The instructor should avoid trivialities as a basis for his questions, and should always avoid tricky language. It is a rule of true-false questioning that the statement must always be stated positively rather than negatively.

It is believed that the relatively inexperienced Navy instructor should not try to construct true-false tests until he has been on the job for some time; it is an ingenious test, and one that will quickly give an indication of knowledge, but it is not a device for a beginner to work with. There are other good tests that will serve the purpose just as well, and the unwary instructor will not be subjected to the pitfalls and shortcomings inherent in the true-false test.

The completion item test is one of wide application; when used in the proper fashion it can be one of the most valuable instruments in the testing field. As with other tests, it must be constructed with care. The instructor must be sure there is one, and only one, correct answer or he will find himself in trouble with his students. It is best to use only one blank to a question, for any more probably will not add to the efficacy of the question and will almost surely add confusion. Trivial details should not be emphasized with questions, otherwise perspective may be lost. A one word response should be called for, and the question should be stated tersely and in a straightforward manner. The average Navy instructor with a little practice in test construction should soon be able to bring himself to the point where he can make up a good completion test; there are fewer dangers to be avoided in this type of test than in most others.

The essay type examination is one used more frequently in subjective courses taught in the tradition manner; its use in shop or vocational training is not recommended. It is difficult for a Navy instructor to make up a good essay test, and even more difficult to correct and mark. It takes longer to write than completion and multiple choice tests; consequently, not so many points can be covered. The essay test invites bluffing, and the student who is facile with words may well score higher than a student who is really better grounded in the material.

Written tests may be planned which include up to three different types of the above tests; more than three tend to confuse the students. In making up a test, more items should be written than will be used, thus allowing the instructor to cull some of the weaker questions. Directions for the test should be clear, precise, and definite; there should be no room for question in the mind of the student after reading the directions. The instructor may save himself work if he organizes the test so that it is easy to correct and score. It is again recommended that he pre-test his items on a few advanced students, and that he work in cooperation with other instructors with regard to the testing program.

Informal Evaluation

Qualitative evaluation is one of the primary duties of the school supervisor or administrator. In general, it

may be said that supervision for evaluative purposes must center on the teaching staff. One educator has defined supervision as follows:

> In general, supervision means to coordinate, stimulate, and direct the growth of teachers in the power to stimulate and direct the growth of every individual pupil through the exercise of his talents toward the richest and most intelligent participation in the civilization in which he lives.[7]

This definition stresses the point that supervision reaches through the teachers to the students for their improvement. Although there are innumerable definitions of supervision, it is usually conceded that supervision is concerned most with people. It is true that the supervisor must deal with many things and objects: buildings, grounds, supplies, assignments, time schedules, and the like, but primarily his job lies in contacting people. Ideally, good supervision brings about personal improvement in instructors with regard to their attitudes and abilities.

Certain characteristics of supervision may be applied directly to the Navy school situation, for while it must certainly be recognized that the majority of Naval officers admittedly have little if any experience in the field of education, they do exercize constant supervision in their own profession. Many points of supervision are common to both, and with thought and practice there is no reason why a competent Naval officer may not develop into an adequate

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[7]Thomas H. Briggs, Improving Instruction, (New York: The Macmillan Company, 1938), p. 2.

school supervisor.

Because the job of supervision is concerned in the main with people, good supervision revolves around the study of individual differences, both in teachers and in students. It is based on respect for human personality. It is the duty of the supervisor to afford his people the opportunity for improvement by understanding their problems and advising for their solution. This modern approach to supervision is increasingly prevalent in the Navy of today, as well. The old stereotype of the Naval martinet is rapidly disappearing, and the modern Naval officer is better equipped psychologically in his dealing with people. The fact that the Navy is a line organization does not preclude the recognition of individual differences; it does, however, disallow rugged individualism, altogether a different thing.

To be successful, supervision must emphasize that all persons concerned with a school organization are working toward a common goal. There can be no duality of objective between the supervisor on the one hand, and his faculty and students on the other. Within the framework of organization cooperation must be manifested in group procedure in the solving of problems incident to the operation of the school. A two-way flow of information and ideas is imperative to improve the calibre of instruction.

Inspections have been customary and traditional in the Navy since its founding; it is to be expected that the custom would be carried over to the school situation, as indeed

it has. While no one would deny that inspections often have a therapeutic effect, there are dangers innate in this system of supervision that warrant careful consideration. The inference is that the inspector knows exactly how everything should appear and be carried on; the fallacy is obvious: in education, no one knows all the answers. While it is desirable for the supervisor to visit each instructor in the classroom, it is palpably impossible if the teaching staff is of any size at all to exercise effective supervision in this manner. Another failing of supervision by inspection is that the inspector has the tendency to judge each teacher on the basis of an "ideal teacher"; this cannot be done. Industry tried for years to use the "ideal man" as a basis for merit rating, but with the growth of industrial psychology it was found that the system was impractical in that the ideal man could never be determined to the satisfaction of those concerned. As long as beliefs and values differ, this way of rating will not be valid.

It is not proposed that school inspections be discontinued in the Navy, but rather that they be limited to inspection of the physical facilities. More attention to buildings and equipment can be inspired in the instructor if he knows that the supervisor makes frequent inspections with such details in mind. However, such inspections are more effective if made during working hours and in the classroom or shop while the men are busy; the inspector can

gain but little impression of the whole if the spaces were cleaned up especially for the inspection and the men are standing by at attention. It is in this respect that Navy inspections may be criticized, for just this situation generally obtains.

Another method of evaluation is the follow-up; its purpose is to check on the effectiveness of the training by contacting persons for whom the trainee works after graduation. A rating scale may be devised and forwarded to be filled out by the new superior, and in this way some perspective may be gained of the training program. This system has the weakness of all rating systems, that no two people mark on the same basis. A further weakness of its use in the Navy is that it may be extremely difficult to follow the man; usually upon graduation from a Navy school the men are sent on leave and then report to a receiving station for further transfer aboard ship. Trying to find where the man ultimately settled is a problem, but a systematic follow-up may very well prove worth the effort involved.

Supervision in the Navy labors under a handicap not found in civilian education; the periodic transfer of both officer and enlisted personnel makes it difficult to promote a long-term attitude of team-work. Supervision of individual instructors is restricted for the same reason. While a paper such as this can outline the fundamentals of

good supervision, no suggestions for their application under conditions of short-time transfer can be offered. Once more, individual differences will play the major part in the interaction between supervisor and instructor and between instructor and student. The best that can be done under existing circumstances is to make available to "all hands" engaged in training information about the principles of various aspects of training and supervision; whether such information is adequate or useful will depend in the final analysis on the administrators of the training program.

Summary and Conclusions

1. Evaluation is necessary in order to determine whether instruction is meeting the objectives of the training program. Both teachers and the results of teaching stand in need of constant evaluation. Such evaluation may be either formal or informal, objective or subjective in nature.

2. The function of the school administrator or supervisor is three-fold: evaluative, remedial, and motivational. He must be able to analyze and evaluate, suggest remedies, and motivate them to a successful conclusion.

3. Formal evaluation entails the operation of a testing program. Three classifications of tests believed to be of the most value to the Navy are: (1) aptitude tests to discover capabilities, (2) diagnostic tests to define the

specific areas of instruction, and (3) achievement tests to measure acquired skill and knowledge.

4. Performance tests are best used to determine the degree of manipulative or mechanical skill developed as a result of training. Performance-type tests must be given to each man or group in exactly the same way, and each must be marked on the same basis.

5. Written tests used in the Navy are usually made up of one or more of the following types: multiple choice, matching, true-false, completion, or essay. Each type encompasses certain short-comings, and is subject to specific difficulties of construction. It is recommended that a pretest of the examination be made with the cooperation of advanced students or with other instructors.

6. Informal evaluation consists primarily of supervision and inspection. Certain characteristics of such supervision are common to both the field of education and to the Navy. It may be expected that a competent Naval officer will develop into a good supervisor of schools, provided he gains experience and practice.

7. Inspections such as those customary in the Navy have their place in the supervision of Navy schools but should be limited to inspecting facilities and equipment, and only incidently to the evaluation of instructors. They should be made while the teaching situation is in process so that the inspecting officer may gain an impression of the

whole.

8. Supervision in the Navy is seriously handicapped by the transfer system currently in effect. Transferring personnel at regular intervals tends to stress the short-time aspect of the situation rather than the long-term objectives. Thus, individual differences in attitude and ability, both of the supervisors and the instructors, will largely determine the effectiveness of the school and of the training program.

EPILOGUE

In view of the tremendous demands made on the training program by modern warfare, one can almost foresee the establishment of Navy schools on a permanent basis, staffed by permanent civilian educators or by Navy specialists, and administered along the lines of scientific management now found in all the leading civilian institutions. Professional requirements of the Naval officer are demanding enough at present without the addition of a whole new area of highly specialized knowledge and ability. It cannot be expected that the average officer will be able to step in and out of a school system without serious detriment to administration, even though he may be proficient in the subjects taught. When a school administrator needs an instructor he is faced with one of two choices: he can either take an expert in the subject and attempt to make a teacher of him, or he can take a teacher and indoctrinate him in the subject matter he is to teach. It was proved conclusively in the training program in the recent war that the latter choice was by far the better: easier, quicker, and more effective.

A critical public sits in judgment on the development and maintenance of the Navy; it is entirely fitting

that they should, for it belongs to them. It is merely entrusted for the moment to the professional officers and men who make up the body of Naval personnel at any one time. Not only do they have the responsibility to maintain the excellence of the Navy, but they also have the tacit obligation to improve it, and training provides the great means through which the continued growth and development of the Navy takes place.

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